

Denman Island Disease (DID) Management

Denman Island Disease (DID), first described in oysters found near Denman Island, BC, Canada, is caused by a protozoan parasite. DID infections can result in up to 30% mortality in older oysters (> 2 years), may represent a marketing challenge for oysters exhibiting the disease's trademark green tissue pustules, and is known to affect several species of oysters important to Washington--including Pacific oysters (*Crassostea gigas*) and Kumamoto oysters (*Crassostrea sikamea*). Significant DID-related mortality events in Washington have not been documented. DID is currently thought to be fairly widespread on the west coast, with uncertainty as to its native provenance.

RECENT REPORT OF DID IN HUMBOLDT BAY, CALIFORNIA

On March 2, 2018, the WDFW Shellfish Program received an application to import Pacific oysters, Kumamoto oysters, and Manila clams from a facility in Humboldt Bay, CA to various destinations in Washington. As required by WDFW import permits, the applicant provided results of a shellfish health screening, indicating an unusual positive test result for Denman Island Disease (*Mikrocytos mackini*) in seed Kumamoto oysters—the first time this has been observed in tests of Kumamoto seed by WDFW. The test results also indicated levels of DID in adult Kumamoto broodstock higher than ever observed by WDFW. Of relevance:

- Humboldt is an important source location for shellfish seed imports into Washington, and possibly elsewhere on West Coast.
- DID thought to be fairly widespread on the west coast, native provenance is uncertain.
- WDFW has managed Willapa Bay as free of DID historically, though surveys in the 2000s indicated presence throughout Puget Sound.
- Shellfish commonly (legally) moved from Puget Sound to Willapa Bay (from FLUPSYS, hatcheries, wet storage) without testing (in-state typically doesn't require; largely imports-only).
- Data on DID presence/distribution is limited to industry-submitted data (no current wild stock monitoring) and from a Puget Sound wildstock survey in the mid-2000s. No wildstock data for Willapa Bay; no current wild stock Puget Sound data.
- DID is not OIE-listed, but tested for by exporters. Listed as Disease of Concern in Canada, presumed present only in southern half of BC. California manages as if it is everywhere.
- WDFW initiative to classify DID as a Class B Shellfish Disease (of comparably less concern as not known to cause significant mortality; compare to OsHV-1 as an example of Class A) in 2007 was never completed.
- A recent (Feb 2018, processed in March) Willapa Bay sample (1 of 44 pooled samples) from another operator tested positive for DID (confirmatory re-test pending).
- WDFW does not have compelling data to change Willapa management approach. More data needed. Could also benefit from more data in Puget Sound. Better understanding of distribution could advise classification and management response.
- WDFW seeks to minimize risk to state shellfish resources while also minimizing economic harm. With shortfall in information, precautionary approach warranted.



Infectious Fish Diseases



Photograph: Jim Winton, U.S. Geological Survey



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What is it?

Viral Hemorrhagic Septicemia (VHS) is a deadly fish virus and aquatic invasive species that attacks and weakens the blood vessels of fish. Broken blood vessels and severe blood loss ultimately causes death. It afflicts more than 50 species of freshwater and marine fish in several parts of the northern hemisphere. Scientists are not sure how the virus arrived. It may have come in with migrating fish, or may have hitchhiked in ballast water from ships. VHS was first found in European freshwater trout in the late 1930s and continues to cause epidemics in European trout farms. It appeared on the U.S. West Coast in 1988 in marine trout and salmon.

Is it here yet?

Yes. There have been sporadic outbreaks in isolated freshwater areas, usually from hatchery fish. Presently the VHS Virus IVb is found only in freshwater, but it may be viable in saltwater. The VHS Virus IVa is in marine waters from Alaska to southern California.

Why should I care?

The virus is highly contagious and has the potential to infect as many as 42 species of fish, including salmon species and all major sport fish in the state.

What should I do if I find one?

[Report a sighting](#)

How can we stop it?

The Washington Department of Fish and Wildlife has instituted rigorous controls to keep the virus out of the state and private hatcheries. Additionally, the agency's recreational watercraft management plan monitors for the virus as part of the efforts against zebra and quagga mussels. Agencies in the United States and Canada have placed

restrictions on the movement of fish or fish products that could represent a risk for spreading the virus to regions outside of the currently known geographic range.

What are its characteristics?

- Infected fish exhibit areas of hemorrhaging on the skin.
- Internal examination reveals swollen and broken blood vessels and congestion of the internal organs.
- Hemorrhages are evident in the eyes, skin, and gills, and at the bases of the fins.
- Fish can appear lethargic and dark in color.
- The abdomen is markedly distended due to edema of the liver, kidneys, and spleen.

Where can I get more information?

- [U.S. Department of Agriculture's National Agricultural Library](#)
- [Focus on Fish Health](#)